

AMERICAN DENDROBATID GROUP

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The purpose of the ADG is to develop better communication between Dendrobatid breeders in North America. It is designed, by its format and bi-monthly distribution, to provide current information and new developments in the hobby. We hope that this will aid us in solving some of the problems which confront us all. This newsletter appears bimonthly at a cost \$10.00 per calendar year. Back issues for 1992 are available for \$5.00; back issues for 1993 are available for \$10.00.

Subscriptions, articles, comments, etc. should be sent to Charles Powell (2932 Sunburst Dr., San Jose, CA 95111 Tel.: (408) 363-0926).

NOTES FROM THE EDITOR

With the start of our third year we are holding a contest for the design of a banner for the Newsletter. A banner consists of artwork and/or a logo which presents the name of the organization at the top of the newsletter. Presently we are just using the words "American Dendrobatid Group." Please submit your idea for a banner to the Newsletter editor as soon as possible. The winner will receive two years of the Newsletter free!

It has also been suggested that even though our Newsletter has been entirely devoted to Dendrobatid frogs, it should be expanded to include the genera *Mantella* and *Atelopus*. These frogs (and toads) are commonly kept by many of us who also keep Dendrobatids. In this issue you will find an article on the genus *Mantella*. If you are interested in seeing additional articles on either of these groups please let the Newsletter editor know. If there is enough interest we will also start a new section of the Newsletter discussing literature related to these two groups.

Also please remember that dues are now due. Please take the time to send in your dues today so you won't miss the next issue.

MANTELLAS: NEW AND OLD

by Malcolm Peaker

Reprinted with permission from the British Dendrobatid Group, Newsletter, No. 17, p. 3-6, June, 1993.

A number of members will be aware that there has been a good deal of activity in the taxonomy of mantellas. Recent publications have changed the status of some forms and a new species has been described. I have been collecting the literature on mantellas for several years and had part of a chapter ready for a book on the biology and captive breeding of mantellas which I am writing with Steve Halfpenny. The following is from the notes for the chapter with additions made in the past few months.

When Jean Guibé of the National Natural History Museum in Paris revised the genus in 1964 he had to deal with a list of twelve species that had been described over the years and assigned to the genus at the time of their description or later. Two of these he

eliminated immediately. One, *M. pollicaris* Boettger 1913, was actually a species of another genus. The other was *M. madagascariensis*, described in 1872 by Alfred Grandidier. At the time Grandidier described his two species, the genus *Mantella* had not been created and until Boulenger erected the genus in 1882 what we know as mantellas were included in the genus *Dendrobates*. Guibé (1964) felt he could do nothing with Grandidier's *madagascariensis*; the specimens were poorly preserved, discolored and impossible to examine properly; Guibé also considered the original description to be inadequate for the definition of a species. As we shall describe below, the question of the status of *madagascariensis* was raised again, in 1981, and resulted in the alteration in the name of a major species.

Guibé (1964) considered, in agreement with earlier work, that *Mantella betsileo* (Grandidier 1872), *M. ebenauui* (Boettger 1880) and *M. attemsi* Werner 1901 were all the same species, i.e. *M. betsileo*, the other species described by Grandidier.

Mantella cowani, as described by Boulenger in 1882, is highly variable in pattern and coloration. Guibé (1964) considered *Mantella baroni* Boulenger 1888, *Phrynomantis maculatus* Thomiot 1889 and *Mantella laevigata* Methuen & Hewitt 1913 were synonyms of *M. cowani*. In 1882 Boulenger described *cowani* and then, in 1888, *baroni*. In his paper, Guibé recounts the curious story of how Boulenger compared *baroni* with *betsileo* and not with the virtually identical *cowani*, a species he himself had described six years earlier! One can only assume that Boulenger had forgotten his earlier description of *cowani*. Given Boulenger's examination and description of thousands of specimens of anuran, perhaps we should not be too surprised.

Mantella pulchra Parker 1925 (with *M. loppei* Roux 1935 regarded as a synonym) was retained by Guibé as a valid species although its pattern and coloration fell within the range described for *cowani*. The distinction between these species depended on the presence of a larger internal metatarsal tubercle in *pulchra*. Since Guibé found the tubercle to be small in specimens of both sexes of *cowani*, he concluded there was a valid case for retaining both species.

Finally, Guibé retained *Mantella aurantiaca*, the famous golden mantella described by Mocquard in 1900 - its coloration was like none of the others. Therefore, after Guibé's (1964) revision, the genus *Mantella* contained four species, viz, *M. betsileo* (Grandidier 1872), *M. cowani* Boulenger 1882, *M. aurantiaca* Mocquard 1900 and *M. pulchra* Parker 1925. That classification, with a key to the identification of the species was given in Guibé's later monograph on the anurans of Madagascar (Guibé, 1978), and the nomenclature has been used extensively in popular books many of which are still widely available in libraries and in print.

The next revision of the genus came in 1981 by Klaus Busse of the Zoological Research Institute and Alexander Koenig Museum in Bonn; he provided a key for the identification of his revised species. Again Busse based his revision on the color patterns but included live as well as preserved animals in his examination. He retained *M. aurantiaca* and *M. betsileo* but he divided Guibé's *cowani* into two species by resurrecting one which Guibé (1964) had considered to be synonymous with *cowani*, namely *M. laevigata* Methuen & Hewitt 1913. In addition, however, Busse considered *M. pulchra* to be a synonym of *cowani*. He lumped *pulchra* and *cowani* together, not on the grounds of differences or non-

differences in the size of the internal metatarsal tubercle, but on the similarity of the color patterns in the two forms. He argued that it was highly unlikely that two species in such close proximity had evolved parallel patterns of coloration.

Busse (1981), like Guibé (1964) ended his revision with four species of *Mantella* but two were not the same - *laevigata* was back in and *pulchra* was out. Busse then made a major change in nomenclature and it is this change which has led to considerable confusion in the popular literature. We described above how Guibé (1964) had been unable to place *M. madagascariensis* (Grandidier). Busse, however, believed it was possible to identify it on the basis of Grandidier's description (black ground color, light green shoulder spots and red hind-legs) as the species described later by Boulenger as *M. cowani*, now including *M. pulchra*. Under the current rules of zoological nomenclature the earlier name had priority and, therefore, the species we had all known as *Mantella cowani* suddenly became *Mantella madagascariensis*! It is not surprising that changes to the rules are being proposed. (As an aside, what would happen if *Mantella pulchra* were regarded as a valid species in a future revision - would the nomenclature then revert to that of Guibé, given that it would be impossible to decide whether Grandidier's *madagascariensis* was *pulchra* or *cowani*?) It is Busse's revision that was used for the list of *Mantella* species in *Amphibian Species of the World* (Frost, 1985).

The four species of Busse (1981) became five in 1988 when Pintak & Böhme described a new species, *M. viridis* from northern Madagascar. They considered it to be closely related to *M. betsileo* but argued that since the two forms were sympatric (i.e. occurring in the same geographical locality) their new form constituted a separate species. Pintak & Böhme (1988) provide color photographs of *M. viridis* in their paper. Recently, these same authors (Pintak & Böhme, 1990) have added another new species, *Mantella crocea*, from the central part of eastern Madagascar; color photographs are shown.

All authors have pointed out the extreme variability of *M. madagascariensis*, and both Guibé (1964) and Busse (1981) illustrated some of the range of variation by line drawings. For example, the dorsal coloration ranges from almost entirely black to almost entirely light (preserved specimens). Guibé (1978) erected a sub-species, *M. m. nigricans*, for a melanistic form from areas in central and north-eastern Madagascar. Busse (1981) added another to that and the nominate form (*M. m. madagascariensis* from eastern Madagascar), *M. m. haraldmeieri* from south-eastern Madagascar. Later authors (Pintak & Böhme, 1988, 1990) have referred to this last form as a full species, *M. haraldmeieri*, within the *Mantella madagascariensis* species-group, attributing this elevation to Meier (1986).

Blommers-Schlösser & Blanc (1991) have re-erected *M. cowani* as a species separate from *M. madagascariensis* but including *M. haraldmeieri* or *M. madagascariensis haraldmeieri*. They note that a study of the syntypes of *M. cowani* in the British Museum are identical to the description of *M. m. haraldmeieri* by Busse. However, in the new *Fieldguide to the Amphibians and Reptiles of Madagascar* by Glaw & Vences (1992) it is stated, 'Recently *M. haraldmeieri* was erroneously considered the same as *M. cowani* (Blommers-Schlösser & Blanc, 1991). After re-examination of the types, however, it has been concluded that the taxon is a distinct species [quoting an article by Busse, Böhme & Glaw, in preparation]. Further new data indicate the existence of two sympatric species, regarded as *M.*

madagascariensis and *M. cowani* [quoting an article by Andreone, in press]. For these reasons, the current taxonomic situation is rather complex. Here we preliminary regard *M. 'cowani'* and *M.s 'pulchra'* "...as color morphs, realizing that they may merit subspecific or even specific status at a future date. Taxonomic revisions will probably be necessary in the future, when more data about variation in calls and color patterns become available."

In the text of the *Fieldguide* are described the following forms:

(i) Under the *Mantella madagascariensis* species complex: *Mantella madagascariensis* (Grandidier, 1872), with *M. 'cowani'* Boulenger, 1882 and *M. 'pulchra'* Parker, 1925 as color morphs of that species; *Mantella haraldmeieri* Busse 1981 [They also describe a 'variable color morph' which may or may not be that seen last year in a batch of frogs confiscated by British customs].

(ii) *M. aurantiaca* Mocquard, 1900

(iii) *M. betsileo* (Grandidier, 1872)

(iv) *M. viridis* Pintak & Böhme, 1988

(v) *M. crocea* Pintak & Böhme, 1990

(vi) *M. laevigata* Methuen & Hewitt, 1913

(vii) *M. expectata* Busse & Böhme, 1992

The last is a 'new species' from south-western and southern Madagascar. Nothing is known of its habits.

Photographs are shown of all species and forms except *M. 'cowani'* and the variable color morph. Although a key to identify the forms is not found in the *Fieldguide*, one is provided by the publishers as an Addendum.

The major problem that taxonomists since Grandidier have faced with mantellas is the lack of morphological differences between putative species in preserved specimens coupled with marked variation in pattern and color in some apparent species. They have had to rely on skin pattern and color differences. Unfortunately, when mantellas are preserved in alcohol for examination and storage, their colors change enormously. Specimens preserved in spirit are completely unrecognizable as the live animals they once were, and it is no mean feat that the taxonomists have managed to do anything at all with this group. Even when using live specimens, the colors may change with environmental factors such as heat, light, humidity and background color.

The second problem is that of the relatively small number of individuals examined, both in total and from different parts of Madagascar, and the use of type specimens. It is all too easy to describe as a separate species one specimen that appears markedly different from another, only for it to be discovered later they are two ends of a distribution curve for color and pattern of a single species. For his revision, Busse (1981) used approximately 100 specimens and there is no mention by Guibé (1964) of how many he examined. As a wider range of specimens from different parts of Madagascar is examined the picture should become clearer. Similarly, the ranges usually given for a particular form are based on the locations where material was collected for museum specimens. It is not surprising that information on distribution has been slow to accumulate given the difficulties of collecting or simply moving around in some of the habitats.

This is not the place to deal with the limitations and methods of classical taxonomy.

However, it is clear that differentiation of the mantellas needs characters other than color pattern and it is noteworthy that, as yet, no biochemical techniques have been applied to this genus. In short, the impact of molecular biology has not yet reached these frogs. Variation in proteins and in DNA sequences has become a powerful taxonomic tool; when these techniques are applied to appropriate samples of specimens from throughout Madagascar, I suspect that the present classification will not last all that long.

The taxonomic work on mantellas has taxonomic implications. Captive breeding may well throw some light on the relations within the *M. madagascariensis* species complex. But unless doing breeding experiments I think we must avoid producing hybrids between the forms which could confuse future keepers. We should also keep BDG records using the present classification. I urge those keeping mantellas to obtain the new fieldguide and let me have a note of the forms they have.

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HELPFUL HINTS

The first helpful hit comes from Charles Powell (the editor) in California. I use an ultrasonic humidifier to increase the humidity in my terrariums. My tanks are designed with a substrate of coarse gravel thru which water is circulated using a power head and undergravel filter. While there is always a water area and water at depth in the tank the top layers can become dry after a few days. The ultrasonic humidifier produces an extremely fine mist that coats every surface in the tank and appears that a cloud is confined within the tank. The mist is directed from the top of the humidifier to the tank (or a number of tanks) by PVC pipe which is just stuck together and not glued so it can be move or changed as tanks are rearranged. I plug the ultrasonic humidifier into an adjustable wall timer which allows the humidifier to go on 3 or 4 times a day for about 30 minutes at a time. With this set up I have noticed an immediate increase in breeding activity in many of my frogs and plant growth has increased greatly. *Tillandsia* growing on the back wall of the tank no longer need watering as they get enough from the humidifier and are growing better than ever.

Ed Oshaben in Ohio has found a good source for inexpensive, well grown bromeliads for your terrariums. It is Tropiflora (3530 Tallevast Rd., Sarasota, FL 34243 Tel.: (813) 351-2267). Tropiflora is aware that some of their bromeliads are being used for tropical frogs and will be glad to make recommendations as to which species might be useful in your terrariums.

Lastly, thanks to Rex Lee Searsey in California, a new mail order source of live foods for our charges has been found. It is Grubco (Box 15001, Hamilton, Ohio 45015 Tel.: (800) 222-3563).

NEW LITERATURE

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ADDS: For Sale

<i>Dendrobates auratus</i> 'Hawaii'	\$25 ea.	Eric Anderson
<i>Dendrobates leucomelas</i> 'Orange'	\$60 ea.	12231 Newberry Rd.
<i>Dendrobates tinctorius</i> 'Cobalt'	\$40 ea.	Gainesville, FL 32607
<i>Dendrobates tinctorius</i> 'Brazil'	\$60 ea.	
(lots of yellow)		
<i>Epipedobates tricolor</i> (3 morphs)	\$30 to \$50 ea.	

<i>Dendrobates auratus</i> 'El Cope'	\$25 ea.	Charles Nishihara
<i>Dendrobates imitator</i>	\$65 ea.	3271 Pinao St.
<i>Dendrobates tinctorius</i> 'Cobalt'	\$35 ea.	Honolulu, HI 96822

The Serpent's Egg (1809 Irving St., NW, Washington, D.C. 20010 Tel. (202) 462 9443) has various wild caught and captive breed frogs for sale Write or call for information.

Wanted:

Dendrobates pumilio - female
red with blue legs

Sean Eric Malolepsy
1742 N. Pheasant
Anaheim, CA 92806
(714) 993-3001

NEW MEMBERS

Eric B. Anderson (Florida)
Tautphaus Park Zoo (Idaho)